

CLAIMS

Now, therefore, the following is claimed:

- 1 1. A system for measuring a distance between materials comprising:
 - 2 a first material having a surface;
 - 3 a second material having a surface, the surface of the second material being separated from the surface of the first material by a gap; and
 - 5 a slot disposed in the first material such that a slot surface is formed on the first material, the distance between the surface of the first material and the slot surface being a precisely known distance, such that when a cavity distance is measured between the surface of the second material and the slot surface, a gap distance is determined by subtracting the precisely known distance from the cavity distance.
- 1 2. The system of claim 1, further comprising a second slot disposed in the second material such that a second slot surface is formed on the second material, the distance between the surface of the second material and the second slot surface being a precisely known second distance, such that when a cavity distance is measured between the slot surface and the second slot surface, the gap distance is determined by subtracting the precisely known distance and the precisely known second distance from the cavity distance.
- 1 3. A method for measuring distance between two materials, the method comprising the steps of:
 - 3 measuring distance between a slot surface formed by a slot in a first material and a surface on a second material, the first material having a surface such that the distance between the slot surface and the surface of the first material is a precisely known distance; and
 - 7 subtracting from the measured distance the precisely known distance to determine the distance between the first material and the second material.

1 4. The method of claim 3, further comprising the step of measuring the
2 precisely known distance between the slot surface and the surface of the first material,
3 the step of measuring the precisely known distance completed before the step of
4 measuring distance between the slot surface formed by the slot in the first material and
5 the surface on the second material.

1 5. The method of claim 3, further comprising the step of measuring the
2 precisely known distance between the slot surface and the surface of the first material,
3 the step of measuring the precisely known distance concurrently with the step of
4 measuring distance between the slot surface formed by the slot in the first material and
5 the surface on the second material.

1 6. The method of claim 3, further comprising the steps of:
2 transmitting a light through the first material and onto the surface of the
3 second material; and
4 detecting reflected light from the slot surface and the surface of the second
5 material such that the measured distance is determined.

1 7. The method of claim 3, further comprising the step of forming the slot
2 in the first material.

1 8. The method of claim 3, further comprising the steps of:
2 measuring a distance between a second slot surface and the slot surface of the
3 first material, the second slot surface formed by a second slot in the second material
4 such that the distance between the second slot surface and the surface of the second
5 material is a second precisely known distance; and
6 subtracting from the measured distance the precisely known distance and the
7 precisely known second distance to determine the distance between the first material
8 and the second material.

1 9. The method of claim 8, further comprising the step of forming the
2 second slot in the second material.

1 10. The method of claim 8, further comprising the steps of:
2 transmitting a light through the first material and onto the second slot surface;
3 and
4 detecting reflected light from the slot surface and the second slot surface such
5 that the measured distance is determined.

1 11. The method of claim 10, further comprising the steps of:
2 forming a cavity by aligning the slot in the first material with the second slot
3 such that the cavity is formed by a gap between the first material and the second
4 material and by the alignment of the slot in the first material with the second slot;
5 transmitting light through the cavity to measure a cavity distance; and
6 determining a gap distance by subtracting from the cavity distance the
7 precisely known distance and the precisely known second distance.

1 12. The method of claim 3, further comprising the step of:
2 comparing the distance between the first material and the second material with
3 a predefined reference distance; and
4 determining an error distance corresponding to the compared distances.

1 13. The method of claim 12, further comprising the step of adjusting the
2 position of the first material such that the error distance is decreased to a specified
3 tolerance.

1 14. The method of claim 12, further comprising the step of adjusting the
2 position of the second material such that the error distance is decreased to a specified
3 tolerance.

1 15. A system for measuring distance between two materials, comprising:
2 means for measuring distance between a slot surface formed by a slot in a first
3 material and a surface on a second material, the first material having a surface such
4 that the distance between the slot surface and the surface of the first material is a
5 precisely known distance; and
6 means for subtracting from the measured distance the precisely known
7 distance to determine the distance between the first material and the second material.

1 16. The system of claim 15, further comprising:
2 means for transmitting a light through the first material and onto the surface of
3 the second material; and
4 means for detecting reflected light from the slot surface and the surface of the
5 second material such that the measured distance is determined.

1 17. The system of claim 15, further comprising:
2 means for measuring a distance between a second slot surface and the slot
3 surface of the first material, the second slot surface formed by a second slot in the
4 second material such that the distance between the second slot surface and the surface
5 of the second material is a second precisely known distance; and
6 means for subtracting from the measured distance the precisely known
7 distance and the precisely known second distance to determine the distance between
8 the first material and the second material.

1 18. The system of claim 17, further comprising:
2 means for transmitting a light through the first material and onto the second
3 slot surface; and
4 means for detecting reflected light from the slot surface and the second slot
5 surface such that the measured distance is determined.

- 1 19. The system of claim 18, further comprising:
 - 2 means for forming a cavity by aligning the slot in the first material with the
 - 3 second slot such that the cavity is formed by a gap between the first material and the
 - 4 second material and by the alignment of the slot in the first material with the second
 - 5 slot;
 - 6 means for transmitting light through the cavity to measure a cavity distance;
 - 7 and
 - 8 means for determining a gap distance by subtracting from the cavity distance
 - 9 the precisely known distance and the precisely known second distance.

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